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Russian Renewable Energy Politics in the Arctic: National Priorities and Local Realities

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Academic dissertation

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To the memory of Jukka Rindell, who knew that understanding Russia begins with a good story.

Cover photo: Umba, Kola peninsula (©Iines Salonen)

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Abstract

The Russian Arctic is known of its vastness of space, unrelenting weather and natural resources. Renewable energy, however, is rarely linked with developing the country's Arctic regions. This dissertation explores what kind of importance could de-centralized energy sources have in a setting dominated by fossil fuel revenues. Initiatives launched by private actors are mainly absent in the Russian Arctic, but this does not mean that the local level does not have agency of its own, nor does it rule out interesting side trajectories developed in the regions. This study examines these issues with the help of three case studies, which explore (i) the key priorities of national renewable energy policies, (ii) the enabling and restricting factors behind the use of biomass for energy in Arkhangelsk, and (iii) the relation between existing power structures and new energy projects in the Republic of Sakha.

In addition to increasing knowledge on renewable energy use in the Russian Arctic regions, this study contributes to the theoretical discussions on public justification, sociotechnical (energy) transitions and the multi-level perspective approach, and carbon lock-ins. With the help of these theoretical concepts, it is possible to analyze Russian energy politics not only as a special case but as a part of a bigger continuum of sociotechnical transitions. Since literature on energy transitions has mainly discussed transition cases in market-led, energy-importing countries, evaluating its key notions in the context of the Russian Arctic offers new viewpoints on their adaptability.

The results of this dissertation state that the Russian official discourse promoting renewable energy use favors concrete, technical objectives at the expense of a more ambitious long-term vision. Various lock-ins restrict the possibility of alternative energy forms to develop, and while new actors work alone, existing lock-ins reinforce each other. However, even the current situation holds many possibilities for alternative practices to find niches and develop. Energy policy-making and regional development are neither top-down nor bottom-up affairs, but instead happen in a dynamic interaction between local, regional, and national actors — despite the highly centralized character of the current political system. These realities offer possibilities for renewable energy projects to take root in the Russian Arctic, albeit as a part of the great power politics related to fossil fuel exports.

Tiivistelmä

Venäjän Arktis tunnetaan laajuudestaan, säälimättömistä sääolosuhteistaan ja valtavista luonnonvaroistaan, mutta uusiutuvaa energiaa harvoin yhdistetään näiden alueiden kehitykseen. Tämän väitöskirjan keskeisenä tavoitteena on valottaa hajautettujen energialähteiden hyödyntämisen merkitystä fossiilisista polttoaineista saatavien tulojen määrittämissä olosuhteissa. Vaikka Venäjän pohjoisilta alueilta puuttuvat suurelta osin yksityisten toimijoiden aloitteet ja sijoitukset, paikallistaso voi joiltain osin toimia oma-aloitteisesti ja yleisistä kehityssuunnista poikkeavia ilmiöitä voi näin ollen esiintyä. Tämä tutkimus syventyy näihin kysymyksiin kolmen tapaustutkimuksen kautta, jotka kartoittavat (i) valtiollista uusiutuvaa energiapolitiikkaa koskevia linjauksia, (ii), biomassan hyödyntämisen mahdollistavia ja rajoittavia tekijöitä Arkangelin alueella sekä (iii) olemassaolevien valtarakenteiden ja uusiutuvia energianlähteitä hyödyntävien hankkeitten suhdetta Sahan tasavallassa.

Venäjän arktisten alueiden uusiutuvan energiankäytön nykytilan selvittämisen lisäksi tutkimus osallistuu yhteiskuntatieteelliseen teoreettiseen keskusteluun julkisesta oikeuttamista, sosio-teknisten (energia)murroksista sekä monitasoperspektiivin ja hiililukkojen periaatteista. Näiden teoreettisten välineiden keinoin venäläistä energiapolitiikkaa on mahdollista analysoida osana laajempaa sosio-teknisten murrosten jatkumoa. Koska energiatuotannon murrosta käsittelevä tutkimuskirjallisuus on toistaiseksi keskittynyt lähinnä vakiintuneen markkinatalouden oloissa toimiviin, energiaa maahantuoviin yhteiskuntiin, keskeisen tutkimuskäsitteistön arviointi Venäjän arktisten alueitten yhteydessä on merkittäväksi hyödyksi niiden yleisen sovellettavuuden arvioinnissa.

Väitöskirja osoittaa, että Venäjän virallinen energiapolitiikka suosii uusiutuvien energialähteiden käytössä konkreettisia ja teknisiä tavoitteita kunnianhimoisempien tai pitkäjänteisimpien suunnitelmien sijaan. Moninaiset hiililukot rajoittavat vaihtoehtoisten energiamuotojen kehitystä, ja samalla kun uudet toimijat toimivat yksin ja erillisesti, olemassaolevat esteet vahvistavat toinen toisiaan. Tästä huolimatta nykyisetkin olosuhteet paljastavat markkinarakoja, joiden kautta vaihtoehtoiset käytännöt voivat mahdollisesti vallata alaa. Venäjän poliittisen järjestelmän erittäin keskitetystä luonteesta huolimatta maan energiapolitiikka ja alueellinen kehitys eivät ole tiukasti ylhäältä alaspäin tai alhaalta ylöspäin määräytyviä ilmiöitä, vaan muotoutuvat vuorovaikutussuhteessa paikallisten, alueellisten ja kansallisten toimijoiden välillä. Tällöin myös uusiutuvilla energianlähteillä on mahdollisuuksia saada jalansijaa maan pohjoisilla alueilla, joskin todennäköisesti vielä yksinomaan osana fossiilisten polttoaineiden hyödyntämisen politiikkaa.

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List of original publications

This thesis is based on the following publications:

I Salonen, H., 2018. Public justification analysis of Russian renewable energy strategies. *Polar Geography* 41 (2): 75-86.

II Salonen, H., 2019 (in press). Modernization of Russian district heating systems with the help of biomass energy – a Gordian knot? *Environmental and Societal Transitions*.

III Salonen, H. The Same, Only Different: State-led Modernization Creating Pathways for Sustainability Transitions in the Russian Arctic. Under review for *Energy Research & Social Science*.

1. Introduction

1.1 Current discussions on Russian renewable energy and the Arctic

The Russian Arctic and its energy resources are themes that have long been in the sightss of the country's ruling powers. In the Tsarist era, scientists and explorers began to discover the mineral riches of locations such as the Kola Peninsula, and since the early years of Soviet nation-building in the 1920s and 1930s, the Arctic has been assigned a special status as something to be conquered, explored, and harnessed. To master a vast and remote area for the benefit of the nation was counted among the first achievements of the nascent Soviet state, a key objective for fulfilling its ideological desire to demonstrate the power that modernity and progress hold over traditional obstacles such as nature and weather. Where the Soviet power sensed riches waiting to be dug up, it transformed large spaces, like the Kola peninsula, into highly industrialized, militarized, and polluted patchworks of factories, mines, and ports (Laruelle 2012; Bolotova 2014; Bruno 2016).

Yet the feat was not over after several Soviet cities, mines, refineries, and gulags had been built on the northern soil and resource revenues began flooding to Moscow. The nature of the Arctic in Russian politics is such that it seems to ask to be conquered all over again. While the Russian Arctic currently fluctuates between carrying high national importance and being a region that, from a Muscovite's point of view, might be most cost-efficient to be "emptied up and refilled with shift workers"[1], one persistent problem remains — how to balance between the wish to keep the region under the tight control of the central government and the enormous investments maintaining it requires. A strained, even colonialist relationship between Arctic regions and far-away central powers that wish to profit from their resources is not a new phenomenon. Nevertheless, the current direction of Russian Arctic politics which pinpoints highly centralized areas of high technological know-how, large-scale investments and lucrative payrolls in the middle of regions otherwise stripped down of any state engagement does highlight the contradiction from a new viewpoint (Kinossian 2017; Gritsenko 2018). Should the emergence of renewable energy use be seen as a part of this continuum or as its challenger?

This study examines the possibilities, successes, failures, and above all *processes* of Russian renewable energy politics in the country's Arctic regions. I focus on the interactions between the national level, where most policies are drafted and where most of the money invested energy projects comes from, and the regional and local levels, which are expected to implement the official plans. My main interest lies in renewable energy politics (rather than simply policies), by which I refer to my aim to touch upon all issues that affect the policy environment, including those that are not officially acknowledged — in other words, the whole process that happens before, during, and after a policy has come into effect.

Both Russian energy and Arctic politics are themes that often invite scholars to focus on issues linked with geopolitics, power relations, or national strategic interests (see e.g. Aalto 2012; Oxenstierna & Tynkkynen 2014; Tynkkynen 2019). Energy is, after all, an essential piece in the political game of favors and disfavors that Russia

1 A claim made by an unknown Muscovite researcher visiting an Arctic conference in Apatity, Kola peninsula, in 2018.

is well accustomed to playing with its neighbors. Against this backdrop, Russia is often discussed either as an "energy giant" or the victim of its own greed and short-sightedness, a type of Midas starving at a table laden with gold, a resource-cursed titan. The Arctic is a source of similarly drastic tensions of high national and international significance. In addition to being the state's prominent resource base, the region is a key component in the chess game of military re-armament and race for new fossil fuel resources played between NATO members and Russia (Laruelle 2012; Sergunin & Konyshev 2016; Tynkkynen et al. 2018).

It is not difficult to explain the slow and, as one could generously put it, gradual emergence of renewable energy use into the Russian energy mix against this background of great power politics. In many aspects, renewable energy projects seem to foreign observers like a passing fancy or a small distraction. The literature on Russian renewable energy development, much like the country's renewable energy policies, has mostly focused on energy initiatives that strive for export in international markets and their possible geopolitical implications, a perspective which is likely to promote this reading of the situation, (see e.g. Tynkkynen 2014; Pristupa & Mol 2015; Proskurina et al. 2015; Koch & Tynkkynen 2019), or on the policy-making environment and official discourse surrounding the issue (see e.g. Gromov & Kurichev 2014; Smeets 2018; Alekseev 2019). Another large part of the research available on Russian renewable energy politics focuses on the technicalities of policies, support schemes, and market conditions (see e.g. Vasilyeva et al. 2015; Kozlova et al. 2017; Lanshina et al. 2018; Sharmina 2019). Less attention has been given to slow and unsteady grass-root developments, due at least in part to their marginal position in national energy politics. However, studies that have given more attention to the actions of local communities, emerging other economies, and successful initiatives in the Russian High North have presented interesting side trajectories to the dominant discourse of oil, gas, and power politics (see e.g. Boute 2013; Skryzhevska et al. 2015; Petrov 2016; Poelzer et al. 2019). The present study argues that even though bottom-up initiatives, which would stem from customer choice and market competition, are mostly absent in the context of the Russian Arctic, it does not mean that the grassroot level could not have agency of its own. This is the research gap that this study aims to bridge.

In addition to increasing knowledge on the state of renewable energy use in the Russian Arctic, this study contributes to the theoretical discussions on sociotechnical transitions foremost by conducting case studies in an environment which has not received as much scholarly attention as it should. Cases in a country such as Russia, which still holds a vehemently skeptical stance towards the anthropogenic causes behind our warming climate, offer an interesting viewpoint to literature on energy transitions. Russia is not immune to landscape pressures and niche actions of its own, and different sociotechnical transitions are emerging in the country. While some might argue that this is just a sign of the need to create façades to divert the attention of Western critics or to promote a certain image, I claim that this view is at risk of slipping into determinism. Even though Russia is more interested in the needs of its own industries, geopolitical goals, vested interests, and national economy than in environmental concerns, this stance does not yet set it too far apart from other industrialized countries (see e.g. Moe 2012 on Japan). Therefore, I argue that exploring current and possible pathways of sociotechnical transitions in a climate skeptical, energy exporting giant like Russia not only helps us analyze these processes in a case

of an outlier, but also as a part of a global spectrum. Literature on sociotechnical transitions is mostly centered around Western (European) cases and, consequently, examines a context where it can be assumed that transitions happening in our time are purposeful in the sense that they stem from actions taken in the battle against climate change (see e.g. Geels et al. 2017). Since the multi-level perspective approach has generally been applied to cases in market-led, energy-importing countries, it is useful to evaluate its concepts, especially that of *niche* and *regime* relations, in the context of heavily centralized, authoritarian, and energy-exporting country. Therefore, the MLP approach suits the unique conditions of this research aim, and has been employed at various stages of the research.

1.2 Research aim

This study explores Russian renewable energy development as a mirror reflecting wider issues than just those concretely linked to the renewable energy projects in question. As we shall see, the cases studied depict the constraints, possibilities, and realities of Russian Arctic politics, regional politics, and the long legacy of established energy systems. The focus on the interplay between national priorities and local projects allows us to gain information on, on the one hand, about the implementation gap between plans compiled in Moscow and the local realities of Arctic regions. On the other hand, this focus sheds light on how events at the international, national, and local levels relate to each other. As an exploratory study, it aims to conduct experiments and combines methods and data in versatile and even novel ways in order to gain more knowledge about the best tools and approaches for analyzing Russian energy politics.

This study seeks to answer **the following research question**:

How does a state as dependent on fossil fuels as Russia view the role and significance of renewable energy sources, and how do these objectives manifest themselves in practice?

In the separate research articles, the main research question is approached via the following subquestions:

> **SQ 1**. What reasons does Russia regard as valid for supporting renewable energy use, and what kind of priorities are embedded within them?
>
> **SQ 2**. What are the best prospects for renewable energy development in the Russian Arctic and what are the key barriers constraining their realization?
>
> **SQ 3**. How do Russian Arctic regions interpret, adapt to, and aim to profit from the directions of national energy policies?

Article I focuses on the first subquestion (SQ 1) by mapping out the priorities influencing renewable energy development at the national level as they are depicted in various official energy policy documents. The results of this first study provide a background for the case studies of Article II and III as they examine the other subquestions (SQ 2 and SQ 3) and take more regional and project-based perspectives. Article II seeks to map out an overview of both constraining and enabling factors

influencing actors working in the field of renewable energy in a manner as exhausting and diverse as possible. To achieve this, it utilizes expert interviews and conducts a case study representing an Arctic region with excellent opportunities for renewable energy use, that of Arkhangelsk. The possibilities offered by biomass energy from wood waste resources and the region's outdated district heating system are the subject of this case study. The region chosen for Article III, the Republic of Sakha, is also endowed with resources and reasons for investing in alternative energy systems. This Arctic region makes an apt research subject for examining the similarities and dissimilarities between new energy projects utilizing renewable and non-renewable energy, and what the processes involved in the emergence of these projects reveal about the dynamics between the federal state and the regional government. The case study examines the modernization efforts of local energy delivery systems by comparing two recent cases, the building of a wind park in Tiksi and the founding of a new regional delivery and road maintenance company, called Arctic Roads.

As a whole, the three studies provide their own viewpoints to the main research question. Article I discovers what kind of role renewables should have, at least on paper, at a phase where there is yet no inconsistency between the official plans and what happens in practice. Article II analyzes a wide array of reasons why it is difficult for authorities to generate the results expected and why projects often result in unpredicted outcomes. The paper also seeks to find out what kind of a part is reserved for renewable energy solutions despite these troubles. Article III continues to study the distance between events happening at the national and regional levels and analyzes the role of renewable energy as a part of broader aspirations regarding regional development, Arctic politics, and geopolitics.

2. Policy context

2.1. Russia's renewable energy politics

After several experiments with renewable energy technologies conducted in the Soviet Union (Dmitriev et al. 2000; Lanshina 2018), Russia has seen only very modest efforts in this field during the last 20 years. The 21st century has witnessed some relatively ambitious declarations in favor of renewable energy, however. One significant institutional push for supporting renewables was the presidential decree of 2008, which made a call for supporting renewable energy as a means to reduce waste and increase energy efficiency. The decree began the current trend of linking the two aims together, which is beneficial to the cause of renewable energy as energy efficiency has become one of the top priorities of Russian energy politics. High energy intensity has troubled the Russian economy since the Soviet era and one of the goals of "Energy Strategy up to 2030" was to reduce it by 40% by 2020. The Federal Energy Efficiency Law of 2009 and the Federal Heat Law of 2010 decreed the legal basis for the joint cause of renewables and energy efficiency and from that moment on, renewable energy has been included in all energy programs and decrees (Gromov & Kurichev 2014; IRENA 2017; Lanshina et al. 2018). It is rarely specified, however, how exactly the increased use of renewable energy would lead to improved energy efficiency. This issue is far from trivial, as this kind of ambiguity of targets is one of the major problems troubling institutional work in the field. The current goal for the use of renewables in total energy production is at least 2.5%, set in the draft for "Energy Strategy of the Russian Federation Until 2035", which has been lowered from the 4.5% of 2009 (Russian Federation 2017; Smeets 2018).

Despite these policy advances, a great deal of deep-rooted reservation towards renewable energy remains in Russia, made visible in certain recent policy documents and other statements. The presidential decree on energy security from May 2019 lists the acceleration of global economic transition toward renewables as a challenge to Russian energy security, although it continues to state that falling behind other countries in global energy trends would pose yet another challenge for national energy security (Putin 2019). Furthermore, renewable energy is still considered as the more expensive and less competitive alternative to fossil fuel industry. In these circumstances, it is not surprising that Russia's ratification of the Paris Agreement took four years since its signing and happened amidst persistent climate change skepticism and wide-spread concerns that the agreement will harm the interests of national industries, especially those of oil and gas producers (Tynkkynen & Tynkkynen 2018; Lanshina 2018; Russian Energy Agency 2019). After the ratification, it was reported that climate change legislation drafted soon afterwards has been reported to have been watered down following objections of the business sector (Khurshudyan 2019.)

The capacity-based renewable support scheme, based on governmental decree 449, has attracted a fair amount of attention since its establishment in 2013 as the first systematic support measure for renewable energy. The scheme focuses on solar, wind, and small hydro power plants, and was followed by another one in 2015, targeting electricity markets and remote areas (Smeets 2018; Boute 2016). While the support system may not favor the materialization of the official renewable energy goals for installed capacity and power production, some actors in the field will probably be able to benefit from it. Scholars have examined the support scheme's goal of increasing the

share of renewable energy production to 4.5% in total energy production and the constraints threatening their materialization with a critical eye, identifying several barriers. Among them were the complexity of the scheme, leaving policy-makers room to interpret its requirements in a too-loose or too-strict manner (Kozlova & Collan 2016). In addition, the scheme favors certain groups of actors, namely the solar power industry, while posing challenges to another ones, especially the wind power industry, as the design of the scheme offers solar power projects better access to guaranteed funding (Smeets 2017). It seems probable that although the support scheme is likely to help developing renewable energy technologies, the scheme remains too modest and won't be able to compete with fossil fuels under the current market conditions (Vasilyeva et al. 2015). Still, it should be noted that after the launch of support schemes of 2013 and 2015, modest growth in investments has emerged, both in remote and more urban areas of the country (Boute 2016; Kozlova & Collan 2016). The localization requirements linked to the same decree were compiled in order to boost the Russian industries manufacturing renewable energy technologies — if most of the installed equipment of a renewable energy project is produced within the borders of Russia, the project meets the localization standards and is thus eligible for a guaranteed return of all investments made. However, it seems that namely the strictness of these localization standards regarding wind and solar technologies has been to blame for the slow growth of these markets as local production does not yet meet the demand (Lanshina et al. 2018; Smeets 2017).

The Russian legislation regarding renewable energy may have the qualities needed for supporting the growth of the industry. For example, regional authorities would in theory be able to promote renewable energy projects in a situation where regulatory guarantees and support mechanisms are still insufficient (Boute 2016). Despite being deemed of uneven quality, some observers have noted the current legislation stands out as the only framework for renewable energy that has thus far been adequately established and implemented (Korppoo & Kokorin 2017; Lanshina & Barinova 2017). As a whole, institutional work has generally been deemed as insufficient, ill-targeted and full of loopholes. To make matters worse, many investments already made have proven not to be financially viable, and inflexible bureaucracy adds to the problem by forming additional barriers. (Korppoo & Kokorin 2017; Pristupa & Mol 2015; Boute 2013; Korppoo & Korobova 2012; Tynkkynen & Aalto 2012). The rapid rise and decline of Russian pellet production and export between 2004 and 2009 provides a good example of problems that persistently cause trouble to actors working in Russian renewable energy development. In their review of the case, Proskurina et al. (2015) listed very modest domestic demand, inadequate transport infrastructure, and the lack of investments as the main problems plaguing the industry and even leading to its decline. They concluded that uncertainty about the implementation of projects once started and low motivation for supporting the industry at the national level posed the most significant problems. Similarly, just a few years after the surge of new biofuel projects between 2006 and 2008 it could be noted that all of the investment projects put in motion during this period were no longer operating (Pristupa et al. 2010).

A model compiled by the Lappeenranta Technical University concluded that in theory, Russia has the potential of becoming a highly competitive renewable energy exporter, which would decrease the price of electricity by 20% by 2030. The optimistic outlook of the model can be explained by the fact that it only considers

technical potential, not the political decision-making processes needed for achieving this state, but nevertheless the viewpoint is intriguing (LUT 2015). Existing research on possible political models for future development emphasizes the importance of improved management and policy implementation, which would also entail reducing government involvement in the energy markets, or alternatively, introducing more targeted policy programs. While the most radical way for change would be via decentralization and complete withdrawal from fossil fuels, other possible scenarios include abstaining from any significant change, economic depression, or centralized diversification. In the case of centralized diversification, renewable energy use would grow as a component of a monopolized energy market and with a leading role of state initiatives and industrial clusters. (Sharmina 2017; Proskuryakova & Ermolenko 2019).

In short, the literature mostly agrees that the Russian political system and markets, which are in many ways intertwined, are not prepared to accommodate alternative ways to produce, transport, and consume energy. It is generally agreed that the generous subsidies paid to diesel fuel imports are among the most difficult barriers to overcome, alongside the unpredictability of the business climate and the lack of pressure regarding the implementation of official goals (Pristupa & Mol 2015; Boute 2016; Tynkkynen 2019). Projects that attract the most political attention and investments are often the ones with the least promising financial prospects, underlining the lack of transparency in many decisions made regarding Russian energy politics (Kinossian 2013). With the added burden of outdated and inefficient energy infrastructure, it is clear that the threshold to invest in renewable energy is high (Collier 2011). What is left to be determined, therefore, is only whether we should view the current problems more as a side product of an inflexible political system or as a product of deliberate political choices.

As the discourse surrounding the Paris Agreement demonstrates, the case of the Russian renewable energy development pertains as often to other issues and interests as to renewable energy. In his recent overview of Russian energy politics, Tynkkynen (2019) frames the issue with the emergence of "hydrocarbon culture" and great power politics. Hydrocarbon culture refers to a mentality where dependence on fossil fuel extraction holds such a central position that all calls for change are futile. The main argument regarding the position of renewable energy in the current political climate is that as long as Russian political leaders are entangled with the revenues from fossil fuel exports, the societal balance they help generate, the international status linked to their extraction, and the associated national identity as a great energy power, renewable energy is bound to remain in a marginal position. The role left for renewable energy is to answer to specified energy efficiency needs and produce certain pilot projects, such as the recent large wind parks, to prove that Russia is capable of offering modern high-tech solutions to the global market in addition to its exhaustive gas pipe network (Tynkkynen 2019).

Alekseev et al. (2019) have compiled a critical review of the Russian Energy Strategy until 2035, focusing on the readiness of national energy politics to follow and answer to global development trends. Their results support the notion that Russia is systemically unprepared for the global trend of resource-innovative economy and decrease in fossil fuel usage, and instead clings to the (fossil fuel based) export-oriented model the country wields at the moment. They conclude that Russian policy making

does not give the renewable energy industry the attention it would require to grow and that the status quo of fossil fuel revenues will remain intact. On the other hand, a study focusing on elite discourse on renewable energy policies discovered that there is an attempt to establish a renewable energy industry in order to meet the global low-carbon energy trends (Smeets 2018). Thus, Russia's motivation to fully support alternative energy resources could stem from hedging against the risk of lagging behind and eventually losing the status of an energy superpower. However, this study also states that the current centralized control over energy affairs remains as the main barrier for the growth of new industries. Therefore, the main reason for moderately backing the spread of renewables would be to secure future fossil fuel revenues (by providing alternative energy models for ensuring their transport, for example) and allow rent-seeking practices to continue (Smeets 2018; see also Andreassen 2016).

Under these circumstances, it is hardly surprising that ecological reasons and action against climate change are rarely discussed in the same context as renewable energy, either within official discourse or in practice. In short, Russia's real commitment to renewable energy, energy efficiency, or climate change action is far from intrinsic and stems mainly from the desire to attract foreign investments and positive attention from an international audience (Korppoo & Kokorin 2017; Lanshina & Barinova 2017; Smeets 2018; Tynkkynen 2019; Tynkkynen & Koch 2019). Instead, policy texts usually give most attention to resource-geographic issues, followed by financial factors and institutional settings, all with very little regard to ecological matters (Smeets 2018). If the Russian state makes an implicit connection between politics of sustainability or renewable energy use and the promotion of liberal and democratic values, decentralization and regional autonomy, as some observers view, it may be that renewable energy is inherently in discord with the authoritarian nature of the current Russian regime. From this logic it would follow that initiatives to invest in renewables would serve more as a Potemkin's façade for democracy and modernity than actual change. In the Arctic, Russia's interest to invest in renewables would thus stem from the region's status as an exception, a showcase of capability for the rest of the world. As a result, some view that renewable energy events should be discussed more in the context of the greater geopolitics of oil and gas, and of ensuring their global demand, than as holding their own agency (Tynkkynen 2017; Koch & Tynkkynen 2019; Tynkkynen 2019).

2.2. Renewable energy development prospects in the Russian Arctic

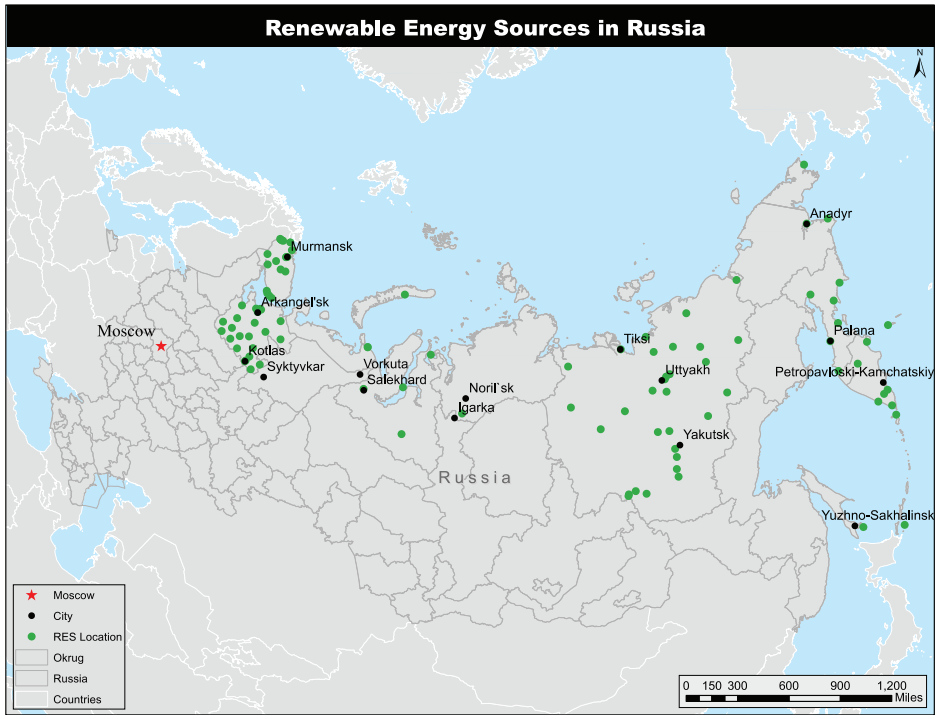
Already since 1997, the Russian government has seen utilizing renewable energy resources more efficiently as a key factor in improving the country's global competitive advantage and developing its Arctic regions. Yet the success of policies and target programs linked to these goals has thus far been modest. The Russian Arctic has proven incapable of providing any easy gateways for renewable energy deployment due to several barriers constraining new projects there, among them the central role of oil and gas production in the region (Boute 2012; Boute 2016; Russian Federation 2017). Despite these challenges, the Russian Arctic provides interesting cases for studying the regional prospects for renewable energy since their unforgiving climate conditions and long distances pose problems that urgently require new energy solutions. Although the Arctic is known as the cornucopia of oil and gas production,

these resources are located very unevenly across the region. At the moment, several remote municipalities use up to half of their budget on transporting fuel from long distances away. In some cases, difficulties in ensuring fuel supply have even led to endangered human lives, and thus renewable energy development offers the most concrete possibilities to provide cost-efficient solutions to the energy needs of isolated communities (Øverland & Kjærnet 2009; Shepalova 2015; Berdin et al. 2017).

The existing system that renewable energy could help unravel is known as the Northern Delivery (*severnyi zavoz*), a maintenance system dating back to the Soviet era. Via its networks, diesel fuel, coal, and other supplies have been transported to remote settlements located outside the general grid in order to enable establishing new settlements and industries there, and ultimately to bring the region under state control. Northern Delivery is the lifeline of the Russian Arctic, as large parts of the region are dependent on imported diesel fuel and coal, which constitute 70% of energy consumed there. Besides the environmental burden this figure suggests, the Northern Delivery is a process which can often take over 18 months to complete, is prone to serious delays and accidents, and takes up a large portion of the regional budget. Accidents and delays, for their part, increase the risk of environmental damage via fuel spills and leaks. In addition, the current energy delivery system releases copious amounts of black carbon into the environment, damages public health, and harms socioeconomic development (Øverland & Kjærnet 2009; Boute 2016; McCauley et al. 2016). Some regions have succeeded in combining the existing support system with their own resources to improve the energy supply security of isolated communities, a way of action which is also commended by the federal government. In addition, other economic, social, and ecological benefits could be connected to using local fuels, especially when the price of diesel is high (Pristupa & Mol 2015; Shepovalova 2015; Lombardi et al. 2016; Smeets 2018).

The current fuel transportation system is often maintained via cross-subsidization. This means that customers living in connection with the central grid pay the same price as those living outside the grid, even though producing energy for these remote locations is considerably more costly for energy companies. Cross-subsidization is not a sustainable solution in the long run, as it harms the region's investment climate and thus hampers its socioeconomic development. The Russian government has aimed to alleviate the problem with the help of direct subsidies, but they address only a small portion of the energy delivery system. The cross-subsidization system has been destined to end in 2020, meaning a considerable hike in electricity prices for isolated communities and a possible increase in motivation to find new solutions. The use of renewable energy sources by, for example, combining small wind energy and solar power with diesel power generators could help not only to save money but also to considerably improve local energy security by adding to the local energy mix. In the official discourse, these initiatives have been linked with the goal of improving the living conditions and the overall socio-economic development in the Russian Arctic, which has long suffered from net emigration, via offering affordable energy for residents and businesses (Boute 2016; Poelzer et al. 2016). In addition to isolated communities, the Russian Arctic holds other prospects for renewable energy development, as well. Biomass in energy production has gained foothold in the Northwest Russia. Even though its position continues to be overshadowed by the subsidies granted for hydrocarbon producers and a lack of federal stimulation, decisions made at the local and regional level have succeeded in increasing the share

of energy production from biomass and establishing effective, albeit limited policy measures (Pristupa & Mol 2015).



Map 1. Renewable energy projects installed in Russian Arctic (January 2019). Map created by Nina Feldman & Steven Chao.

2.3 Political priorities of the Russian Arctic

For Moscow and the federal state, the Arctic is, naturally, something very different than what the small, isolated communities represent. The Arctic has high value for political leaders as a strategic resource base granting the country a steady flow of revenues, which represents 90% of natural gas, 70% of oil, and several important mineral resources (Sergunin & Konyshev 2016). These revenues in turn constitute a large part of international prestige, social balance, and political stability ensuring the continuance of the current regime. Russia's re-engagement with its Arctic regions began with the Arctic Strategy of 2008, the scope of which was further expanded in 2013 (Leksin & Porfiryev 2015). The Russian Arctic strategies of 2008, 2013, and 2014 present an ambitious state policy for the region. These strategies list new priorities that include effective use of natural resources, improving transport connectivity (especially regarding the Northern Sea Route), increasing the socioeconomic well-being of its population, creating a new and more systematic development management model, preserving ecological balance, maintaining the region as a zone of peaceful cooperation, and, importantly, restoring Russian presence

within the greater Arctic region to its full capacity. Many of the planned development tasks also coordinate with Russia's current objectives for national defense (Institute of National Strategies 2016). In addition to these explicit goals, there are several views, often contradicting, regarding Russia's "real" intentions for the region — above all, the degree of rearmament implied within them. While some observers see the heightening of military tensions in the region as inevitable, others argue that the Russian Arctic policies are mainly based on pragmatic calculations and should not be considered as more hostile than those of other Arctic nations (Sergunin & Konyshev 2016).

As noted, climate change is seldom mentioned in the context of Russian Arctic politics and strategies, and hardly ever as a reason for utilizing renewables. Instead, environmental issues in the Arctic are discussed in very limited contexts, such as promoting cleanliness or decreasing waste dumps and emissions (Orttung 2015; Koch & Tynkkynen 2019). Despite this, it is difficult to ignore the possible geopolitical implications of climate change and the political discourse surrounding it in the Arctic regions, which feel its effect even more acutely than other regions of the world. Possible and on-going effects range from opening of new resources and trade routes, militarization, worsening weather conditions, overall global instability and, on the other hand, a heightened need for international cooperation (Sergunin & Konyshev 2016; Tynkkynen 2019). Meanwhile, Russian analysts suspect that the country's geopolitical competitors may seek to undermine the country's sovereignty in the region by appealing to environmental accidents and other similar incidents (Institute of National Strategies 2016). Even if we may not be sure of the "real intentions" of any of the Arctic players, it seems certain that all developments happening in the Arctic regions are prone to quickly attract politically charged implications.

As the official objectives listed above began to materialize during the last decade, several large-scale projects linked to the overall development of the Arctic and especially the Northern Sea Route were planned and executed. Russian national energy companies have begun their own renewable energy programs which entail building large wind and solar parks in the Arctic and the Far East. However, even though the federal state has shown renewed interest in its Arctic regions and wishes to develop them further (with the help of renewables), the vision for the future of the Russian Arctic lacks the kind of comprehensive and holistic — in both a good and bad sense of the word — orientation that characterized the Arctic politics of the Soviet era. It appears that this is not because of a lack of imagination at the administrative level, but rather because targeted and project-led developments are the new path for Russian regional development as a whole. A highly centralized, "mega project based" development trajectory also exposes its subject to a higher rate of non-transparent methods, rent seeking, and implementation gaps between official plans and actual projects realized (Müller 2011; Kinossian & Morgan 2014; Orttung 2015; IRENA 2017; Kinossian 2017).

The emphasis on quick profits instead of slow, structural modernization evidently leaves very little space for sustainability objectives. Even though the socioeconomic development of Arctic regions is high on the list of national priorities, it seems that the actual monetary interest is targeted towards impressive large-scale projects such as building wind parks or ports. The structural, small-scale modernization, which might produce the best results for the official energy security and energy efficiency

objectives, is not given any real consideration. The smaller and more remote the municipalities and local governments are, the less resources and political leverage for carrying out energy reforms they have — despite their possible motivation for making improvements. As a result, even though optimizing the energy delivery systems of isolated communities has been endorsed in several official documents, concrete federal support remains very limited (Kinossian 2013; Orttung 2015; Boute 2016; Tynkkynen 2019). While the Arctic region's status as a geopolitically significant pilot region does grant access to resources and investments that are unavailable to other Russian regions, it may also limit the choices available for the local actors as all initiatives must fit into a very narrow frame.

2.4. A circumpolar perspective on renewable energy and remote Arctic settlements

Renewable energy as a solution for the needs of off-grid settlements has been deployed to a large extent in other far-flung Arctic communities that are dependent on diesel fuel deliveries. Isolated communities in Alaska, Canada, and Greenland find themselves in precarious position not only because of the high cost of diesel fuel, but also because of their dependence on a sole fuel provider without a back-up system (McDonald & Pearce 2012; Boute 2016). Despite the different historical legacies and current political systems, many challenges that these actors in renewable energy have faced are similar to those in Russia. Alaska, Canada, and Greenland have managed to reduce the burden of energy transportations with the help of pilot projects which have involved hybrid installations combining wind power, solar energy, and traditional diesel generators. Based on existing case studies, renewable energy is more likely installed also elsewhere in the Arctic when it matches certain economic objectives, rather than ecological ones or even ones pertaining to objectives of improving energy security and local socioeconomic development. Furthermore, the inertia of established energy delivery and fossil fuel subsidization systems remains as a considerable barrier in Alaska, Canada, and Greenland, and regional variation is notable (Cherniak et al. 2015; Boute 2016; Poelzer et al. 2016; Mortensen et al. 2017; Strand 2018).

While Russia shares many of the central issues and characteristics regarding energy deliveries with other Arctic countries and regions, the difficulty of differentiating between its politically motivated investment decisions and the market-led ones sets the country apart from others. This is the core of the so-called Russian hybrid regime. These realities make it difficult to analyze the logic behind certain investment decisions and to tell private actors apart from the public ones, all of which grant the business climate its notoriously unpredictable label. The investment climate is further complicated by the sanctions decreed after the Ukrainian crisis of 2014 as well as the strict localization requirements, which limit the possibilities of acquiring affordable technology. The leeway of regional and municipal leaders for shaping their own energy politics is very small due to the highly centralized political system and the lack of fiscal autonomy (Müller 2011; Orttung 2015). The investments available are further limited by the fact that most off-grid installations do not belong under the current support systems since they do not exceed the threshold capacity decreed (Boute 2016).

3. Ontological and epistemological considerations: pragmatist and critical realist perspectives

The questions over the reliability and heterogeneity of information are central phases of data collection and analysis. Therefore, it is vital to break down what kind of a stance this study takes towards certain action-theoretical questions present in the background of the research process. In a broader sense, this study focuses on transition and processes, and therefore there is reason to elaborate on the viewpoint from which I approach agency, action, and events in the research articles. The main objective of this section is to establish how these ontological considerations have influenced my choice of methodological tools and data collection.

American theorist, philosopher, and logician Charles Peirce (1839–1914) is regarded as the founder of a philosophical movement known as pragmatism. Among other famous pragmatists at the end of the 19th century and the beginning of the 20th century were William James, John Dewey and George Herbert Mead, among others. In addition to philosophy, the Peircean tradition has since inspired scholars in the social sciences and humanities, and thinkers such as Karl Popper and Noam Chomsky. Peirce's goal was to seek out a methodological definition of the concept of truth, which he believed to be something that may be approached through inquiry (Brent 1993; Misak 2004). For Peirce, inquiry is a process where the state of doubt over an issue transforms to a stable state of belief. Peirce's wide-ranging writings, above all the *Illustrations of the Logic of Science* (1878), emphasize the importance of an exploratory method over others in seeking new knowledge, and the use of clear concepts in this process. The meaning of a concept is, for Peirce, directly linked to the effects or "practical bearings" it has in the world. For Peirce, the scientific practice and the nature of knowledge not only align with each other but are inseparable. Truth is a state of firm belief regarding a certain affair. This state of belief or certainty "would be the result of scientific inquiry, if scientific inquiry were allowed to go on indefinitely" (Capps 2014). Thus, truth does not have a metaphysical definition but instead it is always to be understood as a part of the relation between human beings and the world. Scientific truths are stable beliefs that contradicting empirical evidence or views do not disturb. Knowledge is, however, always fallible and therefore established beliefs may be driven back to the state of doubt if new observations and discoveries arise.

A truth stated without referring to how it was gained via experience, doubt, and belief is empty. Peirce put a lot of weight on verifiability and operationality, but also believed in the reality of abstract concepts, as long as they appear in empirical experience and may be traced back to these roots (Niiniluoto 1999). In addition to his stance on the essential principles in generating knowledge and doing scientific research, this study is especially indebted to Peirce's concept of habit. Instead of viewing habits in the traditional sense as automated routines or simple repetitive actions, Peirce underlined their wider potential and significance which reveal the process-like nature of the human action. Important ingredients such as reflection, rationality, and creativity are all included within the same habitual process. Indeed, the pragmatists came to see the whole world and its changes as a process, but one that progresses not through a smooth curve but via errors and attempts to correct them (Joas & Knöbl 2009; Gross 2018). New knowledge and new ways of action are generated from the so-called cycle of doubt and belief cycle. When actors face a situation where they must stop

to doubt their next step, it is a sign of the absence of habit, and also of the need for new information. After they have decided on the best course of action, based on their interpretation of the situation, this action soon becomes habitual. In short, habit is both prior to and a basic mode of human action — a dichotomy between habit and reason is uncalled for, since the habitualization of skills and ways of action is what makes conscious and creative action possible (Sulkunen 1994: 130–131). John Dewey continued to build on these premises and emphasized the social ingredient of habits such as social learning, common practices, and ways of solving problems (Kilpinen 2015).

The legacy of Peirce is especially visible in the methodology of abduction (also known as the logic of discovery, retroduction, hypothetical inference, or guessing). Peirce's methodology of science is among his most notable single accomplishments and it has become indispensable in the work of both natural and social scientists. Here, pragmatism's general debt to Charles Darwin and Peirce's own familiarization with natural sciences are perhaps visible in the most concrete sense (Brent 1993). Darwin himself is known for taking note of observations that were in discord with his initial hypotheses and for his overall understanding of the situation as a way of attempting to solve the problem of inner bias, i.e. the researcher's tendency to focus on observations that support their initial assumptions (Darwin 1958). The methodology of abduction is a way to operationalize the practice of generating new knowledge via the cycle of doubt and belief. [2]

Abductive inference begins with an observation, perhaps a surprising one, which leads to guessing of possible reasons for it. If there exists a reason which would explain the occurrence of the phenomena observed, there is reason to assume that this reason is true. According to Peirce, new knowledge may be acquired only via guessing, as deduction relies on what is already known and induction builds on existing knowledge. Peirce himself concluded that pragmatism essentially is "nothing else than the logic of abduction" since its methodology is the origin of new hypotheses (Brent 1993). Similarly, for Peirce, all observations we make and the actions based on them are rooted in our inherent habit of making hypotheses, as when we assume that it is raining if we see raindrops breaking the surface of a puddle. When speaking of obtaining knowledge, the pragmatist tradition assumes that "discovery is more important than the defense of what you already know" (Hintikka 2007: 17–18). However, it is important to note that abduction is not meant to be understood as pure guessing or the work of random chance, but that intuition and perceptions have an important role in shaping the scientific process (Brent 1998; Joas & Knöbl 2009).

Contemporary critical realism, famously represented and popularized by Roy Bhaskar, has many points of convergence between its aspirations and the pragmatist tradition, although differences also abound. Critical realism as an approach reaches for a middle ground between a strictly positivist interpretation of the world with its requirements for clear-cut evidence and the relationist positions of constructivism. In this view, research questions and observations are grounded into a belief that there exists a concrete reality, which best theories are potentially able to approach and describe in a way that is as close to its actual form as possible within the human limits. In short, it adheres to the belief that theoretical understanding speaks of a reality that exists regardless of the human consciousness. Our knowledge regarding

2 For the concept of habit in the history of social sciences, see Camic (1986)

the world surrounding us is never a complete overview but ever changing, malleable, and in need for correcting. This addition gives the ism its epithet *critical* (Töttö 2004; Raatikainen 2004; Gross 2018).

In critical realism, concrete observations of the forces causing some observable phenomenon are not required, however, as it suffices that there is some trustworthy implicit evidence. Consequently, also phenomena that are difficult to measure or observe in the strict empirical sense, such as discourses and intentions, may and should be included in the analysis as they are as inherently part of the surrounding world as material entities. Measurable units represent only a small part of the social reality that is as real as all that is visible — in the same way an energy strategy document is only the modest, easily observable part of the political structures behind it. Similarly, the absence of something is part of the reality, like unfulfilled potential in renewable energy usage is still actual potential. Immaterial and invisible elements of reality are also capable of altering the material ones (Bhaskar 1989; Raatikainen 2004; Töttö 2004).

3.1 The practical implication of pragmatism and critical realism

The pragmatist and critical realist traditions have helped forming the basis for this study's methodology of forming research questions, and eventually the choice of data collection and methods. It would not be sensible to attempt to discover answers to questions such as "what do Russian decisionmakers really want", as this kind of a reality would be too subjective and ambiguous. Instead, the core objective of this study is to explore the different levels of Russian domestic energy politics, from national strategies to regional programs and municipal projects. During this process, the research questions have aimed to attain knowledge as reliable as possible about the underlying structures influencing choices made in this sphere. As a theoretical tradition that focuses on action as a process instead of its outcome, while also taking into account the unpredictability and creative solutions involved in human dealings during times of flux, pragmatism responds well to the realities of Russian renewable energy politics as they are perceived in this dissertation. The notion of habit as a cornerstone of human action has influenced my analysis of reasons behind many barriers in the modernization of the Russian energy system, as well as my understanding of my own working practices as a researcher. Furthermore, the pragmatist and critical realist practice viewing research as an on-going, open-ended process of discovering parts of the essence of things and improving the available theories is the leading perspective of this study. These foundations also guided the research process to find methodological tools that underline the act of discovery. Finally, like the work of philosopher John Dewey, this study leans on the assumption that it is possible to find new answers for concrete, pressing social and political problems — and that research may well offer solutions for them (Gross 2018).

The principles of abduction have been essential from the very beginning of each subproject of this study as it was difficult to know prior to starting work which hypothesis and data would yield any interesting results. In pragmatist methodology, the instinct guiding the process of evaluating, including and discarding data and hypotheses may be called the *guiding principle*. It may take the form of an undetermined intuitive idea or a well processed hypothesis; it may originate from research literature,

previous theory-building or even from an educated guess. The guiding principle helps the researcher to narrow down their efforts already from the beginning towards issues and data that they believe will prove out to be the most fruitful. In case the guiding principle does not yield interesting results, it may be altered or discarded at any point (Grönfors 1982).

In this research, the goal of discovery has guided the selection of data and methods to be as diverse as possible. Abductive reasoning is well suited for studying Russian energy politics because it allows one to adjust to new and even contradicting information; they may be "abducted" into the research process to be tested out for their utility at any point. The aim to avoid the bias of verification has been visible above all in that I have resisted the wish to construct a neat narrative but instead allow it to become as thick, diverse, and ambiguous as it needs to be in order to reflect the scope of results gathered. When following this principle, the innately gray and sometimes unreliable data regarding Russian energy projects does not cause fundamental problems at the data gathering phase of research. The guiding principle helps evaluate the usefulness of the observations and facts, but it is not a fixed entity (Grönfors 1982).

Lastly, pragmatism offers a solid justification for mixed methods as it allows and encourages mixing different methods, data, and approaches of research. Pragmatist framework emphasizes that instead of a certain theory or paradigm, the methodological decisions made during the research process should be guided by the research questions and what serves them best. After all, pragmatism states that knowledge is created through action, so it aligns well that researchers would attempt to do the same themselves (Kaushik & Walsh 2019; Maarouf 2019).

4. Theoretical framework

4.1 Energy security and energy efficiency as key concepts

There is a wide variety of literature studying the concept of energy security, which can be associated with a variety of meanings. Traditionally, the term refers mainly to the regularity of energy supply, but the international discussion over the term has broadened its use to refer also to the diversity of and control over energy resources, or the preparedness of managing disruptions (Cherp & Jewell 2011). The Russian official discourse, however, discusses energy security issues strictly in the technical context of securing a steady of flow fuel, especially in cases when domestic energy reserves are in question (Salonen 2018, Article I of this dissertation). Energy efficiency, on the other hand, is often seen as a more technical term. After all, it refers mainly to the need to reduce energy intensity and the metering and optimization included in such efforts (IRENA 2017). This is likely because it is possible to measure numerically the energy intensity level of an energy system, while measuring energy security is a far trickier task. Energy efficiency offers a conveniently concrete and contained frame for discussing renewable energy without broadening the issue to social problems with broader implications within national politics, such as emissions or climate change.

In this study, I do not commit to any specific definition of either term but instead use them in relation to the context at hand, which is usually that of a Russian policy document or other official statement. While in the context of Russian Arctic municipalities and settlements, energy security is understood to equal a sufficient supply of fuel, while other, more ambiguous definitions are also possible and are discussed when relevant. Energy efficiency takes more diverse meanings throughout this study, depending on for example whether the matter at hand has to do with district heating repairs, new technologies, or optimizing energy deliveries. In both cases, the terms are used as they are interpreted to be understood by the Russian actors in each specific context. While it is wise to remember that neither term is inherently neutral nor unproblematic (energy security for whom? How is energy efficiency counted?), I find this approach to be the most pragmatic one for understanding how the Russian actors depict the situation they discuss and work with, and as a result, how these ideas affect the actions taken and events happening.

4.2 Sociotechnical transitions and sociotechnical systems

A sociotechnical transition is an all-encompassing radical change reaching all aspects of how a society produces, transports, and uses energy (Verbong & Geels 2007). As such, the use of renewable energy sources is often a key element of the process. Sociotechnical, sustainability, or energy transition are terms often used interchangeably when addressing the same phenomenon — a processual change within a society involving moving from old (typically fossil fuel consuming) technologies to new (usually low carbon) ones. A transition may be motivated by the need of counter measures against climate change but also by the wish of improving energy efficiency and energy security, or to hedge against price fluctuations. Transitions take place in sociotechnical systems, which are interdependent and co-evolving clusters of social and technical elements, such as technology, supply chains, infrastructure, and markets. These elements exist to provide for the needs of crucial social functions, such

as heat and electricity supply, housing, and transport. While these systems develop and lock into place slowly, their long timespan makes their constituents resistant to change. The main source of stability, however, is not something tangible but rather the grouping of rules, norms, expectations, and habits that emerge as choices made become part of the establishment and come to determine the choices available for new actors in the field. This force is known as the sociotechnical regime, and major ruptures in its sphere are sociotechnical transitions (Geels 2002; Geels 2012; Araujo 2014; Geels et al. 2018; Sorrell 2018;). An example of a sociotechnical transition from the frame of this study would be the use of local, renewable sources of energy in an Arctic municipality instead of transporting coal, gas, or diesel fuel from a location further away.

Literature on sociotechnical transitions underlines that these processes never run smoothly but are plagued with resistance from dominant powers active in politics, business, and everyday life. For this reason, it is necessary to focus one's efforts not solely on examining the technological aspects of systems undergoing transition processes but also the institutions and people involved, whether directly or indirectly. The considerable inertia of sociotechnical systems cannot be undone with the power of technological innovations or targeted consumer behavior change alone. For a deep transformation to happen, far-reaching and interlinked changes are needed. Transitions should be as path dependent in nature as fossil fuel systems are and create lasting link between user practices and technology. Sociotechnical transition may take various different pathways, of which only one option is a total transformation of the system. It is common that the transition begins by improving or adding on to the existing energy systems instead of dismantling them (Geels 2010; Geels 2018; Geels et al. 2018).

4.3 Theoretical grounding of Article I: Justification theory and the Public Justification Analysis

Article I, "Public justification of the Russian renewable energy development", draws from the theoretical framework behind its method, the public justification analysis, mainly as a background explaining the origins of its key concepts. However, justification theory, established by the French sociologist Luc Boltanski and economist Laurent Thévenot (2006 [1991]) in their work *On Justification: Economies of Worth*, offers some interesting points for this study as a whole, as well. Their work is grounded in discussions in the field known as "pragmatic sociology" and Boltanski's assessment of the work of his teacher Pierre Bourdieu and especially his central concept of domination. Instead of accepting Bourdieu's view of the individual as a mostly passive subject of domination unaware of the structures and rules constraining their scope of action, Boltanski and Thévenot consider them as active actors capable of critical evaluation of their surroundings. This state of affairs also entails that the outcome of all situations is eventually open-ended, underlining the importance of process instead of result. Continuous disagreements and critical arguments make up the social order, and moral questions are viewed as inherently essential to the human condition.

When examining average people's skills of critical evaluation, Boltanski and Thévenot focus especially on how people use the commonly shared values of worth when justifying their own actions and judging those of others. These argumentation

tools are based on several examples of common good and, ultimately, moral values which can be assumed to be shared by both the one making the claim and those observing the situation. The sources of justification cluster around six fixed frames of worth, each made tangible by a well-known philosopher: citizenship (Jean-Jacques Rousseau), market (Adam Smith), industry (Henri de Saint-Simon), home (Jacques Bénigne Bossuet), inspiration (Augustinus), and fame (Thomas Hobbes). Worth stemming from citizenship is based on how well someone or something represents the solidarity, common responsibility, and the will of the collective, while market worth is determined by profit and wealth, which is seen to link to common good via market mechanisms. Industry value is based on cost-effectiveness and efficiency, and the domestic frame represents personal relations, traditional values and evaluates one's position in a hierarchical system. The frame of inspiration is not based on other people's opinion but on one's own originality and creativity, while the frame of fame is entirely dependent on others' appreciation and acknowledgement. As we can see, these domains of worth were created for evaluating people, but they may be further elaborated and applied to the study of institutions or the actions of the state. The initial texts are viewed primarily as tools that help us analyze and organize the sources of justification in our time, and they may be complemented by new ones (Boltanski & Thévenot 1991; Kauppinen 2015; Lecarpentier 2015).

Boltanski and Thévenot consider themselves as followers of the dynamic realist tradition but do not want to commit to any strict dogmas. In any case, their view of the processual, open-ended nature of human action is similar to the pragmatist basic understanding of social reality and human action. In addition, the pragmatist interest in habits as mindful, even creative forms of action aligns well with Boltanski's notion of people as aware, critical beings working in interaction with their surroundings instead of only being under their influence (Kauppinen 2015).

4.4 Theoretical grounding of articles II and III: Structuration theory, the multi-level perspective, and carbon lock-ins

The case studies of this dissertation rely on the theoretical framework known as the multi-level perspective (MLP) approach. Popularized by the work of Geels (2010) and a flexible theoretical perspective with many ontological counterparts, the multi-level perspective draws its concept of action largely from the structuration theory, established by the sociologist Anthony Giddens (Geels 2010). Giddens began his research program in the 1970s by arguing that concrete *action* was missing from sociological thinking, by which he meant an on-going, open-ended processes. His action-centered theory on structuration, laid out in his theoretical synthesis The *Constitution of Society*, explores the relationship between human agency and social structures. His main arguments were that action should not be regarded as a series of isolated acts or acts preceded by clear goals and intentions, but that goals rather emerge in the continuously on-going action process. Neither did he believe that actors consciously steer the action as it processes but that our doings are mostly guided by routines. These routines do not represent something rigid and negative but are an inseparable part of autonomous action. Consequently, routinized action and conscious or reflective action should not be viewed as two separate occurrences, and neither should the actors and the structures surrounding them. Instead, Giddens

concluded that structures are in a permanent state of flux as recurrent practices of actors shape them over and over again, while also producing unintended side-effects. "Structures" are defined rather loosely, usually as an amalgamation of rules and resources. For Giddens, structures both restrict action and enable it, while being both reproduced and transformed by the actors, making the relationship between these two entities highly dynamic. Via these repeated routines, even immaterial structures such as language or norms become fixed, and eventually may attain a status close to stable, as institutions often do. Due to this dynamic relationship, human actors are for Giddens never fully powerless and their domination can never be absolute, as also rulers are bound to be dependent of their subordinates to a certain degree. (Giddens 1984; Giddens and Pierson 1998; Kilpinen 2000; Joas & Knöbl 2009).

Giddens's view of action as a holistic, fluid, and continuous processes is in line with the American pragmatist tradition which also, as we recall, rejects all dichotomies between mind and body and emphasizes the connection between action and consciousness. The significance of routines as the driving force of action is also clearly akin to Peirce's views on habits, even if did Giddens not clearly state this connection and is in debt of other philosophical traditions, as well (Heiskala 2004; Kilpinen 2000; Joas & Knöbl 2009). The issue of habits — and of breaking habits — is central for the question of Russian renewable energy development and especially for the issues explored in Article II. This study discusses the possibilities for breaking a "carbon lock-in", that is, an amalgamation of institutionalized habits and the structures formed around them.

The dynamic relationship between structures and actors is the basis of the multi-level perspective approach, which has grown to have a wide and heterogenous following and is prominently referred to in the research on energy politics and societal transitions. The MLP studies the complex, multidimensional interactions happening in the sphere of a sociotechnical system and the resulting sociotechnical transitions. The concepts of a sociotechnical system and transitions were defined in the previous section, and in what follows, I will discuss the theoretical elements of the multi-level perspective in relation to the issues relevant to this study. As a middle range theory, the approach draws from various ontologies and is able to incorporate different viewpoints, including those of evolutionary economics, sociology of technology, and structuration theory. Its concept of rules (or structures) reproduced through action, the active and passive interplay between rule structures and actors, and the resulting two-way pressure for transformation and adaptation, clearly resemble Giddens's social theory, which Geels himself has also noted (Geels 2007; Geels 2012). As for its methodology, the multi-level perspective's reliance on empirical observations drawn from case studies and using them in order to find new connections within the theoretical framework has points of resemblance with the tradition of the abductive methodology (Sorrell 2018).

A socio-technical system consists of three levels, *landscape*, *regime*, and *niche*, where the processes of transition and its resistance occur via dynamic interaction. The *landscape* refers to the contextual developments such as environmental, demographic, or geographic events and changes that are beyond the direct influence of incumbent actors. Both slow-paced trends, such as the global movement on climate change action or pressure from civil society, and sudden shocks, such as fluctuations of market prices or accidents and natural disasters, may act as catalysts of landscape pressure. At the local level, landscape pressure may appear as, for example, the need

to repair municipal heating networks, to find more secure alternatives for fossil fuel imports during the heating season, or to bolster the development of Russian renewable energy industries. The socio-technical *regime* is sustained by formal and informal actors and networks involved in maintaining the status quo (of fossil fuel consumption). It includes all aspects of Russian energy production from extraction to logistics, storage, and consumption of fossil fuels. Alongside material elements, the regime consists of all the actors and lobbies, practices and resource flows, and material elements involved. *Niches* are novel ways to challenge old methods of energy production and benefit from the weaknesses of the regime and the external pressure of the landscape level. An example of niches may be replacing old boilers of heating plants with ones that burn biomass. In addition to technological innovations, niches may also refer to all kinds of new solutions (Geels 2002; Geels 2012; Geels et. al 2017; Geels et al. 2018).

A sociotechnical transition involves several other actors beyond just energy firms and their customers — after all, energy is an omnipresent force in modern societies and links together various institutions, businesses, political offices, and other actors ofs civil society. In many cases, niches succeed in gaining a foothold with the help of targeted policy support or by offering solutions for a specific market or geographic location. This high complexity adds to the probability of unpredictable outcomes occurring during sociotechnical transitions. The regime is inherently resistant to change, but ruptures in the landscape level and new opportunities offered by innovative niches create pressure and may destabilize its balance. When niche actors first emerge and begin interacting with regime actors, they are very unstable and their success very uncertain. But if they succeed to spread and find their own markets, they may gain resources to further develop and stabilize their position. In the case of a successful transition, a new innovation will then break through and spread to the realm of established practices, challenging, complementing, and even replacing them. During the transition process, the regime may choose to incorporate new elements into itself, modify its workings, or resist all changes. In reality, energy transitions only sometimes take a radical and disruptive form. It is much more often a gradual and non-linear process which may last decades. Similarly, niches often have a competitive relationship with the regime, but can also take a more symbiotic form, working as add-ons to the existing structures, increasing the risk of trade-offs (Rotmans et al. 2001; Smith 2006; Geels & Schot 2007; Scrase & Smith 2009; Geels 2011; Geels 2012; Jørgensen 2012; Geels et al. 2017; Geels et al. 2018).

As mentioned, the process of energy transition is most prominently slowed down by the powerful inertia that all previous choices involving fossil fuel consumption have produced, locking prevailing ways of doing further into their place. Research on this phenomenon derives directly from the literature on multi-level perspective and is known as the theory on carbon lock-ins, covering the various difficulties that attempts to introduce low carbon alternatives face from various existing structures (Unruh 2000; Unruh 2002; Seto et al. 2016). While all investment projects are prone to path dependency, energy projects are particularly vulnerable due to the large-scale initial investments needed, the long wait for paybacks, and the long working life of existing infrastructure (Goldthau & Sovacool 2012). Russian energy infrastructure's resistance to change is further reinforced by the Soviet legacy of central planning, which lead to a state where heat producers, industries, and consumers are all bundled together (Collier 2011). A carbon lock-in means, in essence, that the technological-

infrastructural, institutional, and/or behavioral patterns formed around the accustomed way of consuming energy are so well rooted in place that new methods struggle to replace them even if they are a more economic or efficient option. The concept of carbon lock-in is yet another example of the fact that habits, especially social ones, are difficult to break. In Article II, I combine this theoretical basis to a method derived from structuration theory, known as the structuration model. In this way, it is possible to examine not only the carbon lock-ins constraining the Russian renewable energy development but also possible enabling factors that could help break them. The theory of carbon lock-ins has, alike the multi-level perspective, been criticized for focusing too much on the technological side of fossil fuel dependency and neglecting the social one (de Gooyert et al. 2016; Buschmann and Oels 2019; Carrosio & Scotti 2019). Article II contributes to solving this problem by broadening the scope of analysis, better incorporating multiple dimensions of the society into consideration.

The structuration model, developed by political scientist Pami Aalto (Aalto et al. 2012) for analyzing national energy policy-making processes, is a direct variation of Giddens's structuration theory. This relation is most visible in its core assumption that the rules surrounding actors not only restrain the choices available for them, but also act as an enabling force. Actors do not only follow the rules passively but also use them in active manner to understand the world around them and organize it, making room for unforeseen consequences of energy policies and possibilities for niches to spread. The structuration model helps to organize research data according to the resource-geographical, institutional, financial, and behavioral conditions of the energy policy-making environment in question. These conditions, or "dimensions" as named in the model, are understood as both material and social. The structuration model has been previously combined with the multi-level perspective in energy transition studies (Aalto et al. 2017), and the experiment demonstrated that with the help of both, it is possible to better comprehend the multidimensional nature of the structures surrounding energy transitions. I followed this logic and combined the model with the theoretical underpinnings of the theory on carbon lock-ins, as presented above.

The multi-level perspective has received its share of criticism and developed into new directions as a response to it. The critiques that have most relevance for this study have pointed out that certain issues that have been overly emphasized at the expense of others, among them the agency of bottom-up, niche-driven innovations, the technical part of a socio-technical system, the radical, and disruptive character of the niches, and niche-to-regime or landscape-to-regime influence (Geels 2007; Elzen et al. 2012; Bergek et al. 2013; Berggren et al. 2015). To improve the approach, case studies addressing these problems have been conducted, focusing on depicting the complex, manifold, and at times unpredictable ways that niche and regime actors interact and shape each other's realms of action (see e.g. Diaz et al. 2013; Berggren et al. 2015; Avelino & Wittmayer 2016; Geels 2018; Hörisch 2018; Mylan et al. 2018). This study contributes to this work, mainly in Article III, by exploring the points where niche and regime spheres of actions overlap and events of mutual adaptation and adjustment occur.

5. Data collection and methodology

Instead of deciding between quantitative and qualitative methods or committing to the strict dichotomy between the two, this study owes much to the tradition of mixed methods, although qualitative analysis is the main method of evaluating data. It must be noted that there is no clear consensus on how to determine whether a study wields both quantitative and qualitative methods to a degree that it can be classified as "mixed methods", as the ultimate difference between *quantitative* and *qualitative* is undetermined as well and the two categories cannot be seen as mutually exclusive or as inherently opposite (Töttö 2000; Small 2011). Mixed methods are based on discussions that began the 1970s and 1980s in the sphere of sociology that argued against seeing epistemological differences as inherently incompatible and for integrating different approaches in a fruitful way (Sieber 1973; Bryman 1988; Maarouf 2019). In addition to the whole study being based on mixed data analysis, the individual articles contain mixed types of data (Articles II and III) and mixed data collection (Article II). Article II undergoes an exercise to adapt two different theoretical approaches, albeit from similar epistemological backgrounds, into the same thematic system that better matches the data gathered. On this basis, the approach of this article could also be called multiple methods research, considering the border lines between this and mixed methods research are not defined clearly (Maarouf 2019). The data and methods used are discussed in more detail in the section 5.2.

5.1 Case study as a research method

Despite the use of mixed methods in data collection and analysis, the central goal of this study has been to produce qualitative case studies that allow us to analyze and understand some main characteristics of the successes and failures of Russian Arctic renewable energy projects. The central argument for case studies is that a search for universal, predictive theories about human affairs is extremely difficult, and thus methods that are best apt for producing concrete, context-dependent knowledge may also wield the best results when the goal is to examine the surrounding reality in a manner as comprehensive as possible. Generalization and inference may cause some problems that a researcher must discuss in their work, but it may also be argued that illuminating examples, provided by strong case studies, help produce new knowledge as well as or even better than more general theories. For this reason, case studies are very useful for testing hypotheses and theories when they are selected consciously, so that a researcher understands what kind of a view of reality they likely provide (Flyvbjerg 2006). Case studies also align well with the critical realist emphases on utilizing a large palette of methods and approaches when seeking knowledge, and on a broad explanatory scope.

This dissertation includes two geographical cases (the region of Arkhangelsk and the Republic of Sakha), which were selected following information I first gathered from literature and initial interviews. A clue — or as the pragmatists call it, a guiding principle — emerging from my initial inquiries led me to believe that these cases would have some *deviant* characteristics of renewable energy development in the sense that these regions have succeeded where many others have not. For this reason, I could expect that the cases would provide me with enough information to thoroughly

evaluate my research questions and the significance of different indicators. Within the Republic of Sakha, I continued by selecting two individual cases representing energy projects with *maximum variation* in relation with each other, as one is a matter of renewable energy and the other of fossil fuel transportation. By doing so, it was possible to weigh the novelty of renewable energy processes against the established ways of action of fossil fuel production, transportation, and usage in the Russian Arctic.

On the other hand, these regions and projects still struggle with many problems typical of Russian Arctic regions, such as the lack of investments, the poor state of energy infrastructure, and low energy security, suggesting that they serve well in representing the current conditions of the Russian Arctic more generally. Even if the results of this study may not be wholly generalizable in a geographical sense — as the Russian and global Arctic are wide spaces with a lot of variety — it will be possible to make inferences regarding the theoretical discussions over sustainability transitions, thus giving its results more weight. Probably for these reasons, case studies currently seem to dominate the research on sustainability transitions (e.g. Elzen et al. 2012; Diaz et al. 2013; Hörisch 2018; Mylan et al. 2018). Another considerable benefit is that case studies allow for retreating some steps and changing parts of the research design when unexpected problems arise, and thus the method works well with the principles of abductive reasoning.

5.2 Data collection and methods of analysis

It is challenging to find reliable and up to date information about the Russian renewable energy industry, as most resources — such as news outlets, information released by energy companies and official policy-making documents — tell more about the situation as it is supposed or expected to be in the future, rather than about the present state or about failed projects. In addition, since the industry and the current related aim of bolstering the development of Russian high technologies are relatively new, there are few international reports and research articles exploring the issue. In addition, certain difficulties and limitations, discussed in more detail in section 4.5, further narrowed the scope of data collection. However, the shortcomings of this study were considerably alleviated by the continuously increasing possibilities for desk research enabled by open, public databases; newspaper archives such as Integrum and online news outlets; and official websites of energy companies, municipalities, and regional energy production authorities, for example. As the study progressed, I understood the need for casting the net as wide as possible by including a dataset of primary and secondary sources, as mixed as possible, and the possibilities for triangulation this brings.

The use of mixed methods enables and even invites for taking the advantage of triangulation, which in short can be defined as the aim to improve the credibility of research by using more than one method to gain information on a certain topic (Yin 2014; Maarouf 2019). The principle of triangulation and the idea that designing a research project so that it may profit from diverse sources of knowledge is deeply embedded in the tradition of mixed methods research (Brewer & Hunter 1989). Triangulation as a methodological tool does not need to entail cross-checking information or testing the validity of a theory, but instead it may be understood in a

broader manner, as an approach that may offer a more complex and comprehensive understanding of the research subject by exploring the different sides involved and even searching for dissonant data in order to find new avenues for research (Hesse-Biber 2012). Even though different types of data are bound to produce different kind of results, the pragmatist tradition encourages these types of proceedings, as they are part of abductive reasoning and bring the researcher closer to new discoveries.

During the course of this study, I have understood triangulation as, firstly, utilizing a variety of data sources which carry with them different viewpoints and audiences (policy documents, interviews, media material, internet searches), and, secondly, as relying on different kinds of methods in order to discover which are best suited for the challenges and special characteristics of Russian energy politics. My goal has been to balance the scarcity and possible one-sidedness of material available by looking at the phenomenon of Russian renewable energy development from different perspectives — international, national, regional, local, as well as public and private ones.

Article I is based on an analysis drawing from Russian energy policy-making documents that mention the use of renewable energy, which were found by using Russian key word searches. Article II relies on expert interviews, which were mainly collected using the method of snowballing, wherein previous interviewees were asked to recommend other suitable interviewees. I balanced the views extracted from interviews with newspaper material pulled from the online Russian archive Integrum. Article III utilizes different textual materials, including national and regional policy-making documents, local media sources, and newsrooms and press releases of the energy companies involved in the projects and of ministries of the Republic of Sakha.

When analyzing the current Russian policy-making environment and energy projects, one of the most pressing problems for this study was to find a way to extract useful results from this kind of data. One of the gravest problems plaguing the country's renewable energy development has been that the institutional work has thus far been insufficient, inefficient, and full of loopholes for nontransparent practices. When it is uncertain whether the future goals depicted in the official documents used will ever materialize as planned, how can meaningful results be extracted from these sources without compromising the credibility of the research? In Article I, I solved this problem by choosing a method that focuses on priorities that influence the reasons to speak about and support the use of renewables. Public justification analysis is a method developed by sociologists Tuomas Ylä-Anttila and Anna Kukkonen (2014) to efficiently operationalize Boltanski's and Thévenot's theory on justification and aims to detect and frame the arguments stemming from the theory's realms of justification, discussed above in section 4.3. In Article I, I followed their example and added a seventh frame of justification, that of ecological worth. I interpreted the frames so that the industrial value of renewable energy sources may refer to their tangible material worth in improving heating efficiency or energy security. Market value referred to monetary benefits, for example to the profits that are expected from green-tech products. Civic value was understood as increasing social wellbeing by, for example, creating new jobs or improving housing conditions. Ecological value, in the context of the sources employed, usually equaled fighting against greenhouse gas emissions, or in general, finding cleaner methods of producing energy. Other categories of value were later proven irrelevant within the scope of the data gathered.

By using this approach, it was possible to examine the tools that policy-making documents use to ensure their own legitimacy, and also to compare and observe which aspects are emphasized over others. The unit of analysis in public justification analysis is a claim, which are identified in a codebook compiled by Koopmans (2006) and a methodological toolset developed by Ylä-Anttila and Kukkonen.[3] Following the principles of these resources, a data set of political claims was collected and arranged for further analysis. As a result, I was able to discover overarching priorities of the Russian renewable energy development which remain relevant even when certain concrete goals fail to materialize. In addition, Article I contributes to the method of public justification analysis by experimenting with its utility in analyzing official state documents, instead of political discussions produced in the realm of civil society and discovering that the method crossed over to other type of materials without problems.

Article II relies on interviews with Russian and non-Russian experts in order to gain an overview as rounded as possible of both successor and failed renewable energy projects. I developed an analytical framework which combines the theoretical categorizations of both the carbon lock-in theory and the structuration model in order to arrange the results of expert interviews (following the principles of content analysis), separating the factors into constraining and enabling ones, and into ones stated by Russian and non-Russian interviewees. This method proved to be useful when extracting results from interview data, which may include various claims in a short paragraph and a large amount of hypothesizing. The new framework allowed me to present different sides of the case chosen from the theoretical viewpoint which was most fruitful for solving the research questions of the study and studying the combined effect of different carbon lock-ins and the possibilities to break them.

Article III compares two cases of energy projects that have similar origins and involve a large amount of data, as explained above. Most useful keywords concerning both individual cases emerged from the data as the research progressed, which in turn often revealed new sources of data as well. Data of both cases was then arranged chronologically so that it was possible to trace not only the process of the project in question, but also the political steps taken before the energy projects commenced.

Throughout the data collection and especially when arranging data into themes and deciding which material to analyze further, I relied extensively on the principles of abductive reasoning and especially its notion of a guiding principle. Because data regarding specific cases or issues in Russian renewable energy development were often scarce, biased, or patchy by nature, the initial research design often had to be reformed and even abandoned before a way forward was found. However, by way of clues collected from failed attempts of data gathering, be it from research literature, interviews, or websites of regional institutions and energy companies, I was able to hone my research questions until they were the kind that could be addressed with the data that was available. The results of Article I influenced the formulation of the research design of Articles II and III so that the themes emerging most prominently in the first article determined what kind questions and case studies were discussed in later ones. Furthermore, the results of Article II, in particular regarding possible enabling factors in renewable energy development, further influenced the selection of case studies for Article III.

3 Received from authors by request.

5.3 Shortcomings and limitations

Although few, if any researcher on Russian studies would agree with the poetic saying that Russia is better understood with the heart than with mind, the country's politics do sometimes appear as fairly enigmatic to the foreign observer. This state of affairs has, undoubtedly, also been the main challenge of this study. As a Helsinki-based Finnish researcher, with only intermediate skills in the Russian language, I have had to adapt with my limitations in finding useful sources from the start. While I have been able to use official documents, news sources, and websites in their original language, I have had to be very mindful of asking only questions to which limited language skills can find answers. This condition has prompted me to exclude approaches that would require an especially close reading of the text, such as discourse analysis, and underlined the importance of triangulation. Due to the language barrier, I was unable to conduct interviews in Russian (without the help of a translator), which naturally created some bias in the choice of expert interviews for Article II, as it made me more dependent on snowballing contacts than I would have been otherwise.

The lack of local connections was another significant limitation for my study and made me rely largely on desk research instead of on-site observations and more in-depth interviews. For example, in Russia it is very difficult to gain interviews with representatives of local governments and other authorities without an extensive network of contacts. These circumstances further stressed the importance of selecting theoretical questions and methodological solutions that would be a good fit for the data sets gathered. Nevertheless, the results of the study are bound to be somewhat biased and less exhaustive than what would be ideal. In addition, my own position as an outsider exploring Russian domestic energy use creates its own bias, as well, since I do not have first-hand experience on the matter. As for my academic background, it is rooted in two countries, Finland and the UK, each with their own traditions. As a researcher, I have been trained as a social scientist (with specialization in area studies), and oftentimes I noted my knowledge to be incomplete when the more technical, legal, or economical side of energy issues were in question. Acknowledging these possible shortcomings and biases is an important part of research conducted in the spirit of the pragmatist and critical realist traditions, as fallacies — and their corrections via scientific interaction — make up an essential part of unearthing new knowledge.

Finally, the conditions of an article-based dissertation set the researcher up for certain shortcomings, as well. Once an article is finished and published, it cannot be changed anymore, even though it is possible and even likely that the earlier parts of the work would be conducted differently at the time of compiling the synthesis. This slight disparity in knowledge and understanding is somewhat visible in Article I, which could have profited from a wider use of other strategic documents than those analyzed. A wider data set would also have made it possible to focus solely on renewable energy development in the Arctic, which later came to be the main focus of this study.

6. Individual studies

Article I. Salonen, H., 2018. Public justification analysis of Russian renewable energy strategies. *Polar Geography* 41 (2): 75–86.

The first article of the study seeks to establish the official reasons Russia has for supporting renewable energy development. Since it is understood that in Russia, concrete plans and numerical objectives often fail to materialize as supposed, the article approaches the issue from a different viewpoint, going beyond describing specific target programs and exploring the norms and values to which decision-makers, industry actors, and, ultimately, citizens are expected to adhere. The study assumes that these priorities remain and influence the national energy politics even when concrete plans do not come to fruition. In order to discover these priorities, the article analyzes several relevant policy making documents with the help of public justification analysis, a method developed to examine public claims made in favor of a certain cause, and the commonly known values that claim-makers refer to in order to convince others. The rationale of the article is that if we may discover which values decision-makers attach to supporting renewable energy, we will also have a better understanding of the directions the development of the field may take in the future. The theoretical framework of justification claims for this paper is based on Boltanski and Thévenot (2006), as well as the public justification analysis developed on its basis by Ylä-Anttila and Kukkonen (2014).

The dataset of this article consists of six recent official documents dating from 2008 onwards, which depict goals for renewable energy development. Even though strategies and their objectives are compiled by and for the governing bodies, they reflect more broad-based interests, which affect the choices available for the general public, as well (Aalto 2012). From these documents, I extracted political claims, which are the unit of analysis in the public justification analysis. The method entails seven fixed frames of justification, which stem from sources of domestic, inspiration, fame, civic, industrial, market and ecological value, of which relevant for this study are the domestic, civic, industrial, market, and ecological frames. After claims were identified and organized according to these frames, it was possible to analyze the value systems behind them in more detail.

The article reveals that Russian energy policy documents emphasize concrete, technical tasks over more abstract, holistic goals which would entail long-lasting, structural changes. In general, industrial objectives (i.e. the wish to create more opportunities for Russian industrial development) dominate policy-making endeavors, even those related to socio-economic or environmental issues. These tendencies are likely to prevent fundamental structural change in the Russian energy industry, despite the considerable potential of Russian renewable energy, especially in the Arctic regions. Finally, the article shows that the public justification analysis as a versatile method is able to provide new viewpoints on Russian energy policy-making documents.

Article II. Salonen, H., 2020. Modernization of Russian district heating systems with the help of biomass energy – a Gordian knot? *Environmental Innovation and Societal Transitions* (accepted).

The second article of this study is a case study that focuses on possibilities and work done in utilizing local wood waste resources as replacement for fossil fuel imports in the remote settlements of Arkhangelsk, in Northwaest Russia. The article discusses the issue from the viewpoint of a phenomenon known as carbon lock-in, and the ways to break it. The article draws from two different, albeit ontologically similar, theoretical frameworks, that of carbon lock-in theory (with a background in the multi-level perspective approach) and the structuration model developed especially for analyzing national energy policies. The aim of the paper is, first, to create an overview of the situation in a region which has rich renewable energy sources of its own, yet struggles with uncertain and uneven development of the field. Second, my aim was to broaden the scope of the carbon lock-in theory by including ways of breaking the lock-ins into the analysis. In doing so, the article emphasizes that not only sociotechnical transitions but also their barriers include many uncertainties and possibilities for unpredictable outcomes.

The theory of carbon lock-ins includes various types of lock-ins, of which often mentioned are the technological-infrastructural, institutional, and behavioral ones. As for the structuration model of energy policies, it organizes the different enabling and constraining factors into a schema of geographic, financial, institutional, and ecological dimensions. Based on the categories of these two models, I created a new framework and organized data from expert interviews and media materials into analytical categories that consider both theoretical approaches. The framework includes factors in geographic-infrastructural, institutional, financial, and behavioral contexts. These factors may be material or social, and both enable and constrain the choices available for renewable energy actors.

The paper determines that a key issue hampering renewable energy development in Arkhangelsk — and likely more broadly, as well — is that the constraints for alternative energy sources reinforce each other, while the actors working for them find themselves in isolated positions. This is especially true for the institutional and financial constraints. However, by examining the enabling factors it is possible to see how the bundle of constraints could also be undone together. The most efficient way to success for alternative energy would likely require municipalities and actors in the fields of biomass and energy production to form joint clusters and share resources. Finally, the article concludes by emphasizing the importance of the social part of sociotechnical transitions and pointing out that it is not possible to understand the complexity of carbon lock-ins, especially in remote locations such as Arkhangelsk, without approaches that seek to consider all aspects of the issue.

Article III. Salonen, H. The Same, Only Different: State-led Modernization Creating Pathways for Sustainability Transitions in the Russian Arctic. Submitted for *Energy Research & Social Science* (under review).

The third article explores the attempts of one Russian Arctic region, the Republic of Sakha, to modernize its energy delivery systems by introducing more renewable energy and increasing the effectiveness of the current fossil fuel delivery system. My aim is to explore how the national and regional levels interact and interpret each other's needs and priorities when in the process of creating new Arctic policies. The article approaches this question by comparing two case studies — the building of a wind park along the Northern Sea Route in Tiksi, and the establishment of a new company to maintain the roads used for fossil fuel deliveries more efficiently. The focus of attention is in the dynamics of center-periphery relations in the Russian Arctic in a situation where the region is perceived by the federal government as both an object of new global opportunities and persistent threats. Opportunities include the planning conducted for the opening of the Northern Sea Route and the new connections and resources this work may provide for previously isolated communities. At the same time, the difficulties in maintaining inhabited Arctic settlements with increasingly difficult weather conditions and increasing costs cause problems that cannot be overlooked for long. For its strategic importance, the developing of the Russian Arctic may be considered as a "mega project" of its own.

The article combines a variety of materials in order to trace the political origins of both projects, and the administrative work preceding them, as closely as possible. Theoretically, the paper draws from the literature on the multi-level perspective approach and the current discussions on niche-regime dynamics in its spheres. By comparing Russian Arctic realities to the current knowledge on sustainability transitions, the article sheds light on both the utility of multi-level perspective in the Russian case and on the relations between the Russian national state and its regions, which may be more complex and dynamic than often portrayed.

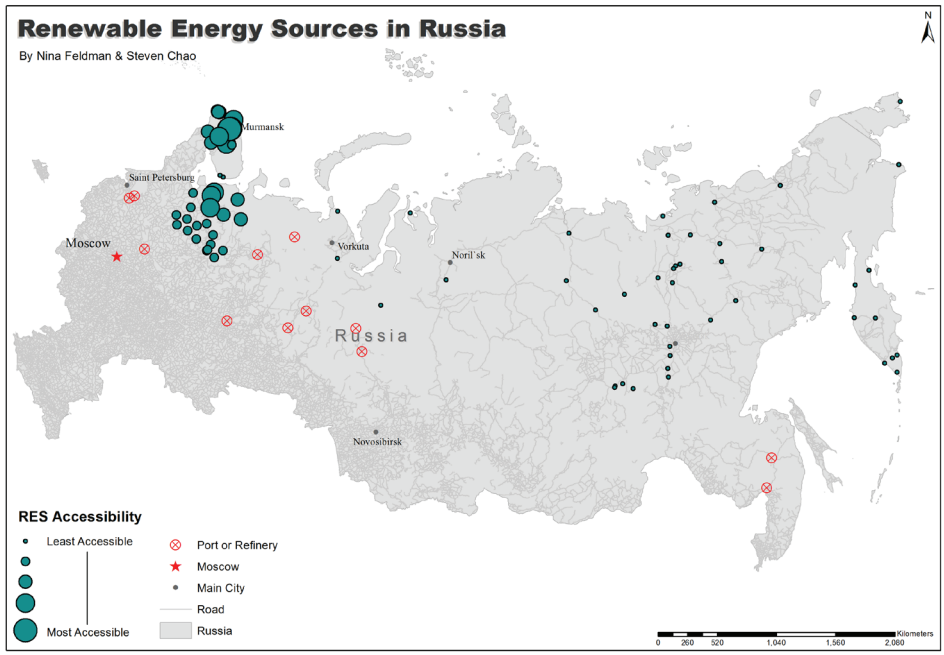
As a result, the article concludes that although the new development orientation in Russian Arctic energy politics, which centers around large pilot projects, is characteristically unpredictable and mostly based on state interventions, it may also provide some opportunities for regions to influence their future, and even more creatively than previously thought. In addition, the areas of overlap between regime and niche actors in the two cases studied are significant, and thus these concepts need to be re-thought when applied to the Russian context. In any case, the Russian Arctic energy projects are a good example of the fact that sociotechnical transitions do not necessarily involve destabilization of regime structures, or even introducing outsider actors.

7. Conclusions

7.1 Answering the research questions

The main research question set to find out what kind of a role is reserved for renewable energy in a country as fossil fuel dependent as Russia, and if one may be specified, how does it manifest in practice. In Article I, I discovered that currently, the role of renewable energy sources is very closely linked to concrete, specific tasks that their use is wished to help fulfill. This usually means acting as an add-on for fossil fuel solutions — for example, as a back-up alternative for energy deliveries to remote, isolated communities. Thus, their frame of action is very narrow and may be easily re-defined, if necessary, in future policy making. The case studies of Articles II and III demonstrate that energy projects tapping into alternative, local resources indeed often overlap and mix with projects involving fossil fuels rather than competing with them. Literature on energy transition processes informed my research that this kind of a dynamic is rather usual, even expected. However, the present study points out at there is often inconsistency between the official goals and priorities of national renewable energy politics and the kind of projects that eventually end up materializing.

In general, it appears that renewable energy projects are carried out for a variety of reasons, among which the most notable are the availability of investments or capable actors. In contrast, projects that would directly address the issues most emphasized in the official documents seem to be fewer in number or struggle to receive funding. It can be stated, then, that the role of renewables remain as two-fold in a way that it has somewhat differing characteristics within the scope of official discourse and in practice, although their default value as a "side-kick" actor in fossil fuel systems remains the same. In the end, the reason why a renewable energy project materializes in the Russian Arctic is probably not because it "ticks all the boxes" of a strategic document but because its economic opportunities, motivated actors, and resources happen to align in a favorable way. Map 2 supports this claim by showing that the installed renewable energy projects do not necessarily align according to which communities would be in most need to improve their energy security. It seems clear that in addition to concrete energy needs, other characteristics of the regions and even municipalities have a decisive part in the matter. As discussed in section 2.4, these kinds of outcomes have also been reported regarding renewable energy development in other Arctic countries with isolated settlements.



Map 2. Renewable energy projects installed in the Russian Arctic based on their accessibility. Map created by Nina Feldman & Steven Chao.

The goal of the first subquestion was to analyze the reasons for the Russian state to support renewable energy use and the kinds of priorities embedded into the official documents presenting these reasonings. The reasons to support a renewable energy source usually have to do with the needs to improve energy efficiency, energy security, and to save budget money by modernizing regional energy delivery systems. These results indicate that the federal state values developments based on their monetary value, industrial and technological advancement, and cost-efficiency. Priorities that are absent from these documents are as important as visible ones, and these include, for example, ecological and local (or indigenous) visions for the future and aims to support the structures of the civil society. These considerations appear at times when positive side-products of industrial modernization, economic opportunities, or technological successes are discussed, but they do not carry much intrinsic value of their own. Thus, long-term development in these fields can only be expected to remain modest.

The second subquestion aimed to map out the best prospects for renewable energy development in the Russian Arctic while asking why despite all the potential, there remain so many barriers, the breaking of which has proven to be very difficult. The underlying reasons for the large amount of barriers are discussed in greater detail in Article II, but one dominant explanation for the current conditions is the persistence of structures of established systems of energy production, delivery, and use (reinforced by the Soviet legacy of centralized urban planning). These conditions result in a situation where infrastructural, financial, and institutional constraints intertwine and strengthen each other. This axis of vested interests, habits, and expectations

embedded in modes of action would be very difficult to undo even with the help of highly motivated actors and politics, let alone in a country where actors working with renewables still find themselves in a solitary position. This state of affairs is probably also one reason why there remains a gap between what kind of renewable energy politics Moscow states that it wishes to support and the form it actually takes in the Arctic regions. The several underlying currents steering the ship towards its old course are often stronger than a new incentive, even if it would provide more cost-efficient solutions than the old ones. Nevertheless, initiatives that have succeeded in bringing public resources together with private ones, and resource flows together with industries and the customers of the heating network, have managed to create energy delivery networks that operate more efficiently than ones based on fossil fuels. Article III continued examining this question by comparing a wind park project managed by a powerful, state-owned actor (Rushydro) and the establishment of a state-owned fossil fuel delivery company. The results establish that the institutional roots and processes of these two projects were largely more similar than dissimilar, further confirming the fact that renewable energy processes in the Russian Arctic are more likely to grow in the 'joints' of fossil fuel systems and other projects of high national priority than as independent initiatives.

The third subquestion continues the task of examining national (hydrocarbon) energy politics as they take shape, focusing on how regions and regional energy actors interpret, adapt to, and aim to profit from the directions of national energy policies. These questions were already implicitly present in the analytical framework of Article II, the focus of which was to study not only constraining but also enabling factors influencing energy actors in their sphere of operations. The results show that the flipside of a barrier often contains a possibility for renewables to spread, granted that circumstances are right. Drawing on these findings, the results of Article III point out that renewable energy projects may serve as one way for regions to advance their own needs regarding energy deliveries and infrastructure, above all, by linking them to new national priorities and thus granting access to investments. Since regional and municipal governments have little power over their own fiscal revenues and most federal funding is project-based, pilot projects with powerful financial backers represent one of the few opportunities to attract money to isolated regions. The answers to the third subquestion broaden our understanding of the role that renewable energy sources are most likely to gain in Russia, which appears to be linked to the fluctuations of national strategic priorities and the investments they entail. The results of Article III thus add more nuance to the analysis of Article I. While the priorities stated in the official decrees, documents, and speeches do not change significantly over the course of years and even decades, the concrete form these guidelines take may be interpreted differently and varies according to the possibilities available.

7.2 Future themes in Russian renewable energy development

In the current situation, it seems that the largest single obstacle in the way of renewable energy development in the Russian Arctic, despite all the concrete opportunities, is the lack of an ambitious, long-term vision entailing structural change. The current political system is not prepared for actual change but resists it in almost every arena. As regions lack their own monetary resources, they aim to adapt and adjust to Moscow's

priorities in order to attract investments. Often, however, these priorities are not well attached to the local realities nor reflect their most pressing issues. Strategies and policy programs are written with the emphasis on opportunities represented by new energy solutions, with less attention on current or possible problems affecting the success of these solutions. In addition, the priorities of Russian pilot projects are known to be prone to quick fluctuations, as was noticed when a lion's share of federal resources was directed to the building of the bridge connecting the peninsula of Crimea with Russia, putting several other regional infrastructure projects on hiatus. Under these conditions, it is clear that even the great visions that are sometimes embedded in regional "mega projects" may not even survive the time frame of the target program involved.

While conducting this dissertation, I was involved in a study combining different exploratory empirical methods and aiming to examine and compare all communities of the Russian Arctic which have taken up renewable energy initiatives (dating to January 2019), from nano to small scale (which at present is the largest one) (Gritsenko & Salonen, forthcoming). We discovered that the communities adopting renewable energy can be categorized into four diverse groups. The first group is relatively well connected and features more often in target programs and national strategies. The second group consists of proactive communities that have both natural resources and work force, high civic activity, and that have spent a large share of their budget on utilities. The third group includes receptive communities that lack aforementioned resources and engagement and take a passive role regarding their energy development. Finally, the fourth group is comprised of opportunity-driven communities where experiments with renewable energy are easy to conduct because resources are readily available.

In conclusion, this study on the role of communities discovered that the role of the local level and regional variety seem to be more elemental in determining whether renewable energy will develop in a certain municipality than the involvement of the federal state. Even when policies are the same, as they mostly are in a highly centralized system, their outcomes often differ largely across the remote Arctic settlements. Initially, we assumed that factors like transport accessibility, a higher share of utility spending and active administration would correspond with a stronger incentive to develop renewable energy projects but noted that communities with lower rates of all these might also implement new projects for other reasons. It is therefore difficult to predict which factors in the end will be determinant in renewable energy deployment but they did not correlate very closely with the objectives stated in official strategies (such as need to improve energy efficiency and/or energy security). In sum this paper shows how renewable energy development in the Russian Arctic does not seem to follow a single, greater narrative that could be easily traced back to top-down policies of the national level. While this speaks of a lack of motivation and a long-term vision in renewable energy politics, it also points to local discrepancies in resources, agency, motivation, and capacity, which should not be overlooked. Better capacity-building, education and overall strengthening of agency of local communities would likely be the most efficient way to increase the amount of renewable energy installments in the region (Gritsenko & Salonen, forthcoming).

Despite the multitude of barriers in the way of renewable energy development, the results of this dissertation point to the diversity of the field of Russian energy politics.

I believe that Russian policy-making dynamics are exposed to more influences than what is visible in the official discourse. Although regional and local actors cannot be viewed as wholly independent due to the highly centralized political system, their relationship with the federal state in shaping their energy politics entails a great deal more negotiating and adjustment on both sides than a simple top-to-bottom command chain. After all, the federal government is presently not capable of implementing its decisions in far-flung locations without the help of regional leaders and other actors. I argue that while the Russian policy-making climate is known for its unpredictability and project-based direction, turning one's gaze to local events and conditions gives us a better understanding of important developments in the longer run by demonstrating how the actors and structures involved contribute to, or resist, change. I do not wish to suggest that a larger diversity of actors, objectives, and pressures would necessarily result in a larger share of decentralization, democratization, or better prospects for actors working with alternative technologies. While uncertainty and loopholes may open up possibilities for new actors, they may also further hamper and harm the work of institutions and financing instruments that would be essential for supporting the emerging industries, allowing again more leverage for nontransparent practices. I do not, however, believe that the dominant status of hydrocarbon industries and the geopolitical tensions of the Arctic politics signifies that all developments in the Russian Arctic should be included into a singular greater narrative reproducing these themes. Instead, based on the variety of development trajectories depicted in this study, it is worth underlining that Russian (Arctic) regional diversity should not be overlooked as a factor shaping the future of renewable energy development, nor should the possibilities represented by renewable energy be ignored as a factor influencing the future of Russian Arctic regions.

Recently, other environmental issues have become urgently topical and have compelled the Russian authorities to address them by resorting to methods that are very similar to the ways in which renewable energy issues are being framed in the current political discourse. The forest fires engulfing large parts of Siberia in the summer of 2019 resulted in the declaration of a state of emergency in some regions, as well as public condemnation of the perceived reluctance of local authorities to take the issue seriously (Kennedy 2019). In autumn of the same year, questions over waste management policies, or the lack thereof, caused outrage in Arkhangelsk and the Komi Republic. Protests against plans to set up a large dumping ground between the two regions for Moscow's domestic waste grew into a popular movement demanding better waste management solutions and pointing to other environmental problems, as well. In both cases, the authorities responded to the criticism by attempting to limit public discussion over the issues to technical, concrete topics. More complex and politically charged ones, such as the wide-spread effects of climate change, or the ability or interest of authorities in Moscow to heed them, were pushed aside. Very similarly, renewable energy is discussed in the official plans and discourse as a strictly technical issue not associated with the need to re-evaluate any aspects of the current political, financial, or societal systems. Despite these efforts, however, protests over environmental concerns have quickly spread to include issues such as indigenous rights, fiscal policies, pension issues, and overall political dissatisfaction and even engaged people that were previously inactive politically (Galeev 2019; Gorbacheva 2019; Pertsev 2020). The political implications of environmental threats will probably become even more difficult to overlook since events of this kind cannot be expected to decrease in number in the coming years.

While I was compiling this synthesis, in December 2019, Russia published its plan to mitigate the negative effects of global warming while also, if in any way possible, profiting from them. The plan does not mention renewable energy sources or energy issues in general, apart from the wish that the future warming of its northern regions will result in decreasing heating expenses (Russian Federation 2019). While the vague language of the statement and the lack of policy incentives for structural change do not give much reason for optimism, the plan may be viewed as another indication that the topic of climate change has gained a new foothold in the national politics. The future will show how these new guidelines will be interpreted and what kind of new strategies, target programs, and even legislation the plan might bring along. Renewable energy cannot (yet) be viewed as a challenger of the status quo, but on the basis of this study, one may assume that all initiatives that are set in motion — much like the effects of climate change — will have implications that may not be contained within the narrow issues touched upon in the official discourse.

7.3 Implications for further research

This dissertation is first and foremost a data-driven project. For reason of necessity, most decisions regarding its research design were made based on where I believed I woulds find useful data and under which conditions. The characteristics of the data retrieved also guided me when selecting suitable research questions, theoretical discussions, and methodological approaches. Despite the limitations of this approach, while conducting the research from this basis and after familiarizing myself with the abductive methodology, I came to appreciate the aspect of discovery related to keeping options open while making inquiries on the variety of data available. Not having a clear concept of the questions to which the data should provide answers for often allowed noticing surprising connections, comparisons, and possibilities, which at times led to more interesting and topical research questions than what I had initially written down. There is a good amount of open-access data hosted by Russian institutions available also for researchers based outside of Russia. These data sources, combined with the possibilities of new tools and approaches that help organize them, will provide novel viewpoints on Russian governance, regional development, and the practicalities of energy politics.

The methodological approaches and theoretical understanding of literature on sociotechnical transitions, namely the multi-level perspective, proved to offer useful viewpoints for the Russian cases even when some concepts or terms did not translate as well for conditions differing from the decentralized, heavily market-led ones often studied in the scope of MLP (see e.g. Elzen et al. 2012; Diaz et al. 2013; Berggren et al. 2015; Geels et al. 2017; Mylan et al. 2018; Hörisch 2018). The successful application of the multi-level perspective to the Russian context indicates that the research discussions on both issues could profit from each other more. Comparing the Russian development trajectories with the theoretical approaches emerging from sociotechnical transitions research helps us to remember that Russia, despite its special characteristics, is not an exception but instead under the same pressures and influences as other states. Therefore, the means to react to the issues caused by them do not differ that greatly from those wielded by others, either. As for research on sociotechnical transitions, I believe that paying more attention to energy exporting,

authoritative powers such as Russia will bring us closer to defining its key concepts more accurately and help identify the interactions between different levels in a more nuanced light.

Some characteristics influencing the future of Russian energy and Arctic politics, such as problems associated with the existing implementation gap, the low capacity of regional institutions, or the possible motivation of local actors to invest in new projects, are often only visible in a smaller scale than the national one. Therefore, conducting yet more case studies drawing from regional and local realities, using data retrieved from a variety of sources, would contribute significantly to the overall understanding of Russian energy politics. Paying more attention to regional characteristics, in addition to analyzing the current political discourses and policy-making environments, allows more information about the outcomes and processes of political events to emerge. Future research would benefit from continuing to explore how various regions of the Russian Arctic adapt to the partly conflicting pressures of growing strategic importance (and possible linked investments), net emigration, effects of the warming climate, and the inescapable need to update outdated energy delivery systems. All of these large-scale events will impact different regions and even municipalities in different ways, depending on their standing regarding fossil fuel production sites, links to the Northern Sea Route, proximity to China, presence of military bases, amount of isolated communities and indigenous people, and their level of socio-economic development. The spread of renewables in other parts of Russia will affect how domestic industries will develop and what kind of pilot projects will appear as favorable. Exploring these processes will likely enable future Russian scholars to discover phenomena that have long been active and significant, yet invisible on the surface.

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